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THE NEEDS OF THE RAILROADS

THAT the railroad companies may fulfil their duties to the nation, it is essential not only that their tariffs do not impede commerce but that the work of transportation be adequately performed. This includes the provision and maintenance of sufficient facilities—tracks, locomotives, cars, buildings and structures—and of a properly organized and disciplined force of employees. It includes also, if the performance is to be continuously adequate, an extension of the facilities of the railroads as the volume of traffic increases. Inasmuch as the railroads of this country were constructed by capital subscribed by bondholders and stockholders, and as their extension must be provided for mainly by subscriptions of further capital to stock or to bonds, it is obvious that the profits from operation must be sufficient to attract capital in competition with other opportunities for investment.

Seventy or eighty years ago, the first and foremost need of the country was for means of communication and transportation, and capital was subscribed simply that railroads might be built, profit from their operation being usually a future and secondary consideration. Traffic in general was undeveloped, and there was no criterion by which the success of a projected railroad could be gauged. The probable volume of traffic, amount of earnings and expense of operation could only be guessed at. Subscriptions were frequently made directly to thepromoters.

Nowadays, as a rule, before capital in considerable amounts is subscribed either to build a new or to extend an existing railroad, a proposed issue of bonds or stock is scrutinized by one or more of the great banking houses. The consent of a banking house to negotiate the issue does not indeed guarantee either the integrity of the investment or the continuance of return upon the investment, but such negotiation gives the issue a prestige proportionate to the confidence which the banking house enjoys among its clients and depositors and the public in general. The examination on behalf of the banking house is made by experts, who consider, in case of an existing property, its physical condition, traffic and administration and, in the case of a new railroad, the traffic which will probably come to it and the ability of its projectors. A somewhat similar scrutiny of the record of the railroads of the United States as a whole will afford basis for conclusions as to what they need in the way of extensions and of increased facilities, and in the way of capital with which to provide for such betterments.

The principal factors through which the record of a railroad is brought to test are:

(1) *The gross earnings*, which depend upon the rates and the volume of traffic. Traffic is measured by ton miles, the unit being one ton of freight carried one mile, and by passenger miles, the unit being one passenger carried one mile. The sum of ton miles and passenger miles may, for the purposes of this article, be considered as the number of traffic units, although the two units differ in many respects.

(2) *The operating expenses*, which depend upon the facilities for operation and the efficiency of the methods of operation, modified however by the volume of traffic and the peculiar requirements of particular traffic. Facilities are measured by miles of line, miles of track, number and tractive power of locomotives, number and capacity of freight cars, number of passenger cars and number of employees of the various grades. Efficiency of operation is measured, other things being equal, by the ratio between the units of operation and the units of traffic, and also, other things being equal, by the ratio between the gross earnings and the expense of operation. Units of operation are freight-train miles and passenger-train miles. The greater the ratio of tons to freight-train miles and the greater the ratio of passengers to passenger-train miles, the greater is the efficiency of operation. The lower the ratio of operating expense to gross earnings, the greater is the efficiency of operation.

(3) *The net earnings*, which are what is left of the gross earnings after the operating expenses and taxes have been paid. This remainder, plus the income from sources other than opera-

tion, constitutes the fund from which interest on funded debt and dividends are payable, and from which contribution is made to the surplus.

(4) *The capitalization*, the amount upon which the bondholders and stockholders expect return.

The relation borne by these various factors one to another in the progressive performance of the railroads of this country is shown by the following tables of percentages. As publication of collected statistics of the railroads of this country did not begin until a number of years after the close of the Civil War, and as the comprehensive presentations of the present day were attained only by gradual development, no one of these tables is based on information for any part of the period prior to 1871, and for many of the headings information is obtainable only for more recent years. Information for the years prior to 1889 has been compiled from Poor's *Manual;* for 1889 and subsequent years, from the statistics of the Interstate Commerce Commission.

During the decade from 1875 to 1885 the comparative increases in the different phases of railroad activity were as follows:

FACILITIES	INCREASE (PER CENT)
Miles of line	72.38
Locomotives	67.09
Freight cars	113.85
Passenger cars	23.32
FINANCE	
Capitalization	77.61
Gross earnings	53.57
Net earnings	45.27
Operating expenses	58.42
Interest and dividends	57.93

This decade of rapid extension of the railroads immediately followed the uniting of small roads serving a local traffic into through lines. These through lines were extended in advance of traffic, and new railroads were built into undeveloped regions. With the extension of the through lines was inaugurated the competition for long-distance traffic. Rate wars and rebates were at their height during the early years of the decade.

Then, owing to the steadying effect of the traffic associations, dividends increased until the volume of traffic fell with the minor depression of 1884. Of the increase in capitalization about two-thirds is accounted for by the cash value of new line and new equipment, leaving about one-third, or about $1,200,000,000, to be accounted for by buildings and other structures, franchises and other assets, and the natural increase in the value of the properties in general, with whatever there may have been of "water."

The ratios of increase from 1885 to 1895 are as follows:

FACILITIES	INCREASE (PER CENT)
Miles of line	41.45
Miles of track	47.51
Locomotives	38.46
Freight cars	47.34
Passenger cars	91.51
TRAFFIC	
Ton miles	73.39
Passenger miles	33.44
Traffic units	66.00
FINANCES	
Capitalization	21.34
Gross earnings	39.19
Net earnings	29.74
Operating expenses	44.25
Interest and dividends	27.42

That during this decade there was more of intensive than of extensive growth is shown by the fact that the percentage of new line was little more than half as great as during the previous decade and was six per cent less than the ratio of increase of miles of track. Miles of line, miles of track, supply of locomotives and freight cars all increased in practically double the ratio of the increase of capitalization. It was toward the close of this decade that new and powerful locomotives and new and enlarged freight cars came into service, the increase in power per locomotive and capacity per freight car making the actual increase in equipment far greater than that indicated by the increase in numbers. There was a marked increase in the number of passenger cars. The cost of additional track and equipment acquired during this decade exceeded the increase in capitalization, a fact which indicates that the cost was met in great measure from the earnings. The low ratio of increase indicates a hardening-down of capitalization, caused by this placing of earnings back into the properties and also by the scaling-down through receiverships and reorganizations following the panic of 1893. The earnings for the decade as a whole did not gain in proportion to the increase in facilities. The last year of the decade, however, was one of severe industrial depression, gross and net earnings each falling about twelve per cent below the amounts for 1893.

The ratios of increase from 1895 to 1905 are as follows:

FACILITIES	INCREASE (PER CENT)
Miles of line	20.72
Miles of track	29.29
Locomotives	35.46
Freight cars	44.76
Passenger cars	22.96
TRAFFIC	
Ton miles	118.78
Passenger miles	95.26
Traffic units	115.84
FINANCE	
Capitalization	17.34
Gross earnings	93.65
Net earnings	98.45
Operating expenses	91.62
Interest and dividends	62.40

This decade also exhibits a greater proportion of intensive than of extensive growth, miles of track, supply of locomotives and freight cars all increasing in far greater ratio than miles of line. The extraordinary increase in the number of passenger cars during the preceding decade explains the low ratio of increase in this decade. The cost of the additions to facilities again exceeds the increase in capitalization. Indeed, the proportion of the earnings of the American railroads that was being turned back into the properties excited apprehension in foreign countries, and the English investors sent over an expert to examine into this disposition of the earnings and to ascertain if there were justification for it. He reported that the maintenance of the railroads and their development to meet the extraordinary increase of traffic that began with 1898 made imperative the expenditure of vast sums upon improvements and extensions. At this time the surplus capital of the country was pouring into industrial combinations, which were being formed upon a scale hitherto undreamed of. The expenditures for improvements made by the railroads out of their earnings tended still further to solidify the capitalization. This naturally elicited complaints from the stockholders, whose dividends were not augmented to an extent at all corresponding with the increases in traffic or in earnings.

The pressure for lower rates, the steady increase in taxes of all kinds, the rapidly increasing wages and the mounting prices for all material used by the railroads forced great economies in methods of operation. These were made possible largely by the powerful locomotives and the capacious freight cars. The traffic units carried per dollar of capitalization, which had increased 38 per cent from 1885 to 1895, increased 91 per cent from 1895 to 1905. The number of traffic units carried per mile of track increased 13 per cent from 1885 to 1895 and 66 per cent from 1895 to 1905. The number of traffic units carried per locomotive increased 21 per cent from 1885 to 1895 and 59 per cent from 1895 to 1905. The number of traffic units carried per employee increased 22.59 per cent from 1895 to 1905. This greater performance per unit of plant is also reflected in the ratio of the capitalization to the earnings. In 1885 it took $10.15 of capitalization to produce one dollar of gross earnings; in 1895, $8.84; in 1905, but $5.36. The capitalization per unit of traffic was 13.4 cents in 1885, 9.7 cents in 1895 and but 5.3 cents in 1905. This result was attained notwithstanding that the average rate per ton per mile in twenty years had decreased 27.5 per cent.

The progressive efficiency of the American railroads, the progressive increase, both relative and absolute, in their contribution to the activity of the nation are shown by the fact that the rate of increase in traffic carried was persistently greater than the rate of increase in capitalization or in earnings, notwithstanding the decreasing charge for transportation. These results are summarized in the following tabulation:

	1875 TO 1885	1885 TO 1895	1895 TO 1905
Traffic units: increase (per cent)	——	66.00	115.84
Capitalization: increase (per cent)	77.61	21.34	17.34
Gross earnings: increase (per cent)	53.57	39.19	93.65
Net earnings: increase (per cent)	45.27	29.74	98.45
Return to capital: increase (per cent)	——	27.42	62.40
Rate per ton per mile: decrease (per cent)	——	20.00	8.70

In the vociferous discussion of the past few years so much has been said about the "fictitious" capitalization, the "over" capitalization, the "wind and water" in the capitalization of the railroads of the United States, that the statement that the capitalization per mile has been gradually diminishing will doubtless be received with incredulity. Yet that is the exact truth, as shown by the statistics published by the Interstate Commerce Commission. In connection with the tables of capitalization published in its annual volume of statistics, the commission states that, in so far as the given amount of capitalization includes bonds or stocks of railroads which are owned by other railroads, the total represents a duplication.[1] For example, the Northwestern Ohio Railway Company and the Pittsburg, Fort Wayne and Chicago Railway Company have each issued stock, which, however, is owned principally by the Pennsylvania Company. The Pennsylvania Company has issued stock which is in large measure supported by these underlying issues of the Northwestern Ohio Railway Company and the Pittsburg, Fort Wayne and Chicago Railway Company. All the stock of the Pennsylvania Company is in turn owned by the Pennsylvania Railroad Company. It is therefore manifestly a duplication to include the stock issues of the subsidiary companies as well as the total stock issue of the Pennsylvania Railroad Company. For another example, a majority of the stock of the Mobile and Ohio Railroad Company is owned by the Southern Railway Company and is therefore covered by the stock of the latter company. It is therefore a duplication to list the entire stock of the Mobile and Ohio as well as the entire stock of the Southern in a table giving the capitalization of the American railroads. This, however, notwithstanding its statement just referred to, is what the commission does, making the average capitalization $65,926 per mile for 1905. If from the total capitalization as given in the tables of the commission we deduct the amounts of duplicated capitalization, as given in the statistics of the commission, the average capitalization per mile for 1905 is found to be $51,201 instead of over $65,000. The average capitalization per mile for 1895 was $52,676; for 1885, $61,400; for 1875, $59,593. In 1875 there was very little ownership of the issues of one railroad company by another and in 1885 the proportion was still small. This period of promotion and rapid extension doubtless knew more or less of watered capitalization, that is, if the capitalization be considered at par. It was the custom, however, to issue large amounts of stock as a bonus to induce investors to place their money in bonds, and these issues of stock, dependent upon future development for whatever value they might have, sold far below par. The receiverships and reorganizations following 1893 reduced the average capitalization per mile to $52,676 in 1895. In the following decade the development of the "community of interest" led to very large purchases by this company and that company of the stock and bonds of other companies, and one effect was that the average capitalization per mile in 1905 was but $51,201 at par. This low average is also in part accounted for by the extensions made out of earnings. In 1890, for every $295 of gross earnings, one dollar was spent for permanent improvements; in 1895, the ratio was one dollar for improvements to every $320 of gross earnings; in 1900, one dollar for every $66; in 1905, one dollar for every $63; and in 1906 one dollar for every $49.

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[1] *Cf.* Statistics of Railways in the United States for 1905, p. 55.

The relative decrease in capitalization, together with the tremendous increase in facilities and in improvements in operation, accounts for the fact that the ratio of the value of plant to a given amount of traffic decreased 28 per cent from 1885 to 1895 and 45 per cent from 1895 to 1905. In view of these facts it seems impossible that there can at this time be any substantial amount of water in the capitalization of the railroads of the United States. Such over-capitalization as still exists is sporadic; and where water is still to be found it is being forced out by the receiverships and reorganizations that occur from time to time, just as the healthy body forces deleterious elements in the blood to the surface and then ejects them from the system.

For the decade ending in 1905 the railroads carried 115.84 per cent more traffic for 93.65 per cent more money, the volume of traffic therefore increasing 22.19 per cent more rapidly than the compensation for carrying it. The employees, dealers in supplies and others concerned in the operation received 91.62 per cent more compensation, while capital received but 62.4 per cent greater return. For the year 1907 the disposition by the New York Central Railroad of its income, dollar by dollar, was as follows: for salaries and wages, 38.2 cents; to dealers for supplies, *etc.*, 30.8 cents; for interest and rentals, 17.8 cents; for taxes, 3.1 cents; for dividend, 9.7 cents; for surplus, 4 cents.

The facts brought to light by this scrutiny—that the railroads have moved a greatly increased traffic at lower rates, that they have vastly increased their facilities with a relatively decreasing capitalization, and yet that their expenses for operation have increased about fifty per cent faster than the returns on their capital—demonstrate a progressive economy of administration from which their employees and the public have derived a far greater proportion of benefit than the bondholders and stockholders.

Another question of foremost importance is: what has been the effect of this economy upon the railroads? Although the record of their performance as disclosed by these statistics is that of constantly increasing achievement, every one knows that during the period from 1898 to 1907, the railroads of this country had to face increasing criticism and execration and a seemingly universal hostility. Shippers were not supplied with as many cars as they desired nor as promptly as they desired them, shipments were subjected to long delays in transit, and there was one disastrous wreck after another. The popular antagonism found vent in laws enacted by congress and by many of the state legislatures—laws that increasingly impeded the operation of the already overburdened railroads. There were few to believe that the officers of the railroads, the men who in reality were accomplishing the magnificent results placed in evidence in this article, were doing the best that they could do. There were few to believe even their simple statement that, if anyone would show them how to produce better results under the limitations that bound them, they would be only too willing to avail themselves of suggestions.

The truth, however, is that the railroads, which had suffered severely from the depression following the panic of 1893, did not anticipate and were not prepared for the tremendous traffic that sprang from the renewal of business activity in 1898. Although new equipment was ordered and facilities were extended, the extraordinary volume of traffic was regarded by them, as by business men in general, as a transient rush of prosperity after the dam of depression had been broken down, and it was generally believed that the force of the movement would soon be spent. The mounting earnings permitted increased distribution among stockholders, many of whom had received for years little or nothing in the way of dividends, although they had seen surplus earnings put back into the railroads. The phenomenal increase of traffic each year was however exceeded by a yet more phenomenal increase the next year. Car and locomotive factories and rail mills became overcrowded with orders, and railroad employees, from general managers down to section men, were struggling with an ever-rising tide of traffic that threatened to overwhelm them. The results of their struggle have been indicated. But even a railroad man must be a blind partisan not to admit that, in the half-decade from 1900 to 1905, the railroads of the United States were unequal to the demand, or to deny that at times they weakened seriously under the strain. The figures tell the story. In ten years the traffic increased 115 per cent. This was double or more than double the increase in facilities and about seven times the increase in capitalization. Had it not been for the panic of 1893 the ton miles for the decade ending 1895 would have increased at least 100 per cent. They did increase 73.39 per cent, and for the decade ending 1905 they increased 118.78 per cent. Speaking broadly, the freight traffic of this country increases about 100 per cent every ten years, and there is every likelihood that it will increase 100 per cent or more in the next ten years, a period of depression being more than made up by a return of prosperity.

Twenty years ago the traffic units were eighty billion a year, and preparation for a one-hundred-percent increase meant provision for an additional eighty billions. Now the traffic units are over two hundred and fifty billions a year, and preparation for a one-hundred-percent increase means preparation for an additional two hundred and fifty billions. It is not likely that it will be possible during the next ten years to reduce the ratio of the value of plant to unit of traffic in any such proportion as during the last ten years. Freight cars cannot be built any higher, without a change in the standard of overhead clearances throughout the country. They cannot be made any wider, for they will not pass on a double track. They cannot be made any longer, for they are now standardized in length to fit the loading and unloading facilities at elevators, warehouses, ore docks and so forth. Likewise the power of the locomotives cannot be increased except through intensive improvement. Therefore provision for a one-hundred-percent increase in traffic will more nearly approximate a one-hundred percent increase in facilities than heretofore. There must be extensive purchases of real estate for enlargement of yards and terminals.

If provision for a one-hundred-percent increase of traffic meant an increase of one hundred per cent in facilities, the existing railroad plant of the United States would have to be doubled. Let us assume, however, that the traffic increased by one hundred per cent can be handled with facilities increased by eighty per cent. Taking the cost of main-line track at $30,000 per mile, other track at $15,000 per mile, locomotives at $15,000 each, freight cars at $1000 each and passenger cars at $5000 each, it will be found that an eighty-percent increase in the track and equipment of 1905 would cost over eight and one half billions of dollars. The requisite real estate would probably cost another half billion of dollars, bringing the total expenditure necessary to provide for the traffic of the decade ending with 1915 to an average annual investment of nine hundred millions of dollars.

If this expenditure is made on capital account, the capitalization of the railroads of the United States will have to be increased to over twenty billion dollars. In 1885 the total return to the capitalization of the railroads was but 3.38 per cent, in 1895 but 3.55 per cent. In 1905, on the capitalization as given by the Interstate Commerce Commission, the return was 4.4 per cent; on the net capitalization as given in this article it was 4.9 per cent. For this year, moreover, 62.84 per cent of the total railway stock paid no dividends at all, and the average rate of dividends that were paid was less than six per cent. Of the total funded debt 78 per cent reaped a return which averaged less than six per cent. The entire surplus of all of the railroads of the United States was less than one-tenth of the annual expenditure that will be needed to keep them abreast of the traffic.

As shown by government reports, summarized by the writer in another article,[1] the net return to the capital invested in manufactures averaged 15.1 per cent for the year 1905, the net return to the capital invested in agriculture 9.8 per cent for that year. Into these two branches of our national industry, particularly into the manufacturing and the allied mining industry, capital was unhesitatingly poured. When, however, the overburdened condition of the railroads as a whole had become apparent to every one and they entered the market with propositions for hundreds of millions of dollars of new capital, the nation stood aghast at their temerity. When even the clogged and congested Pennsylvania Railroad sought to parallel its facilities between Pittsburg and New York, voices were not lacking to criticise what was called its rashness. The truth is that the railroads did not begin to ask for new capital soon enough nor in amounts large enough. Had their requisitions begun with the resumption of business activity in 1898 and 1899, fewer mills and skyscrapers might, perhaps, have been built in the next half-dozen years, but the facilities of the railroads might have been kept well ahead of the demand. When they did ask, what did they receive? Bond issues even of stable companies could be sold only at a discount and in many cases only at a heavy discount. When the necessity for radical and unprecedented increase in the facilities of the railroads became imperative, rail mills and car and locomotive factories in their turn were overwhelmed with orders, many of which they could not fill for a year or even for two years.

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[1] Logan G. McPherson, "The Farmer, the Manufacturer and the Railroad." *North American Review*, November, 1907.

If during the great prosperity that marked the year 1905 the railroads were able to earn less than five per cent, what must be the result with expenses increased—as they have increased since that time—and with a diminished traffic? It is a condition and not a theory that confronts the railroads. They must make ends meet, and they must provide for the future. Not only must they make returns on the capital in the existing plant, but they must demonstrate the possibility of making returns that will enlist capital in the doubling of that plant. This must be done, not merely that the investment of capital may be profitable, but that the transportation needs of the country may be met.

To whatever extent the waterways may be developed, they cannot supplant the railroads upon which the greater portion of the burden of transportation now falls and of necessity will continue to fall. In substantiation of this statement it is necessary only to remind the reader that, particularly in the busier Northern states, canals and rivers are frozen over throughout a considerable portion of the year. It is necessary only to look at the network of railroad lines on the map of any of the states and to consider what would have to be done before waterways could even fractionally take their place. Holland would no longer be the typical land of dikes and ditches. How could canals supplant the service now rendered to mills and warehouses into which the tracks of the railroads penetrate?

If the expenditure of the railroads cannot be lowered, their revenue must perforce be increased. Revenue may be increased through an augmentation of the volume of traffic or through an advance in rates. If during the prosperous year 1905 and at the rates then prevailing the railroads could not pay five per cent on their capitalization and could not obtain new capital except at heavy discount, what are they to do when confronted with the necessity for additional capital in vast amounts?

Compared with the average of the decade from 1890 to 1899, the average wages for 1905 were 14 per cent higher and the average hours of labor per week 4.1 per cent lower. Food advanced an average of 12.4 per cent and all commodities an average of 15.9 per cent. The average rate per ton mile of the railroads decreased 8.8 per cent. The men who ship the larger portion of the freight say, almost without exception, that railroad rates are low. The docket of the Interstate Commerce Commission since the enactment of the Hepburn law shows few complaints of importance, and more of these have been decided in favor of the railroads than in favor of the complainants. The rates of freight do not affect the retail prices of the great staple commodities of daily and general use. If the railroads of the country find it necessary to advance their rates, in order to obtain the capital requisite to equip them to move the traffic of the country, there should be no objection from any one.

There are many freight rates that cannot be increased without impeding, or, perhaps, in some cases, stopping, a flow of traffic. There are many freight rates that can be advanced a fraction of a mill or even a fraction of a cent a mile without burden to the producer or the consumer, but with an immediate benefit to the railroad companies that will, in turn, inure to the benefit of every producer and every consumer in the United States. Not only is adequate transportation necessary to the material welfare of every producer and every consumer, but of many kinds of merchandise the railroad companies are the largest purchasers in the country. When the railroads are prosperous, the good effects ramify throughout industry in general. When they are crippled, allied industries are crippled, and the baneful effects are transmitted along every nerve fiber of the industrial organism.

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